

This listing of claims will replace all prior versions of claims in the application.

Claims 1-123. (cancelled)

Claim 124. (new) A method for preparing a photoresist composition, comprising:

a) providing a polymer by a polymerization reaction that comprises adding over the substantial course of the polymerization reaction one or more incorporated polymerization reagents to a reaction mixture,

wherein multiple incorporated polymerization reagents are reacted, and the incorporated polymerization reagent with the second fastest reaction rate relative to the other incorporated polymerization reagents is added to the reaction mixture over the substantial course of the polymerization reaction; and

b) admixing the polymer with a photoactive component.

Claim 125. (new) A method of preparing a photoresist composition, comprising:

a) providing a polymer that comprises units that comprise a polymerized maleic anhydride group, the polymer provided by a polymerization reaction that comprises adding maleic anhydride over the substantial course of the polymerization reaction to a reaction mixture; and

b) admixing the polymer with a photoactive component.

Claim 126. (new) A method of preparing a photoresist composition, comprising:

a) providing a polymer that comprises units that comprise a polymerized acrylate group, the polymer provided by a polymerization reaction that comprises adding a acrylate compound over the substantial course of the polymerization reaction to a reaction mixture; and

b) admixing the polymer with a photoactive component.

Claim 127. (new) A method of preparing a photoresist composition, comprising:

- a) providing a polymer that comprises units that comprise a lactone moiety, the polymer provided by a polymerization reaction that comprises adding a compound comprising a lactone moiety over the substantial course of the polymerization reaction to a reaction mixture; and
- b) admixing the polymer with a photoactive component.

Claim 128. (new) A method for preparing a photoresist composition, comprising:

- a) providing a polymer by a polymerization reaction that comprises adding over the substantial course of the polymerization reaction one or more incorporated polymerization reagents to a reaction mixture;
- b) admixing the polymer with a photoactive component; and
- c) exposing the photoresist layer to radiation having a wavelength of less than about 300 nm and developing the exposed the photoresist layer to yield a relief image.

Claim 129. (new) The method of any one of claims 124, 125, 126, 127 or 128 wherein multiple incorporated polymerization reagents are reacted, and the incorporated polymerization reagent with the fastest reaction rate relative to the other incorporated polymerization reagents is added to the reaction mixture over the substantial course of the polymerization reaction.

Claim 130. (new) The method of any one of claims 124, 125, 126, 127 or 128 wherein multiple incorporated polymerization reagents are reacted, and the incorporated polymerization reagent with the second fastest reaction rate relative to the other incorporated polymerization reagents is added to the reaction mixture over the substantial course of the polymerization reaction.

Claim 131. (new) The method of any one of claims 124, 125, 126, 127 or 128 wherein multiple incorporated polymerization reagents are reacted, and the incorporated polymerization reagent with the slowest fastest reaction rate relative to the other incorporated polymerization reagents is present in the reaction mixture at the start of the polymerization reaction and is not added to the reaction mixture over the substantial course of the polymerization reaction.

Claim 132. (new) The method of claim 126 wherein the acrylate compound comprises a photoacid-labile ester.

Claim 133. (new) The method of any one of claims 124, 125, 126, 127 or 128 wherein a reaction mixture that contains one or more polymerization reagents is initially provided at the start of the polymerization reaction, and

one or more additional polymerization reagents are added to the reaction mixture over the substantial course of the polymerization reaction.

Claim 134. (new) The method of claim 133 wherein the reaction mixtures comprises an optionally substituted carbon alicyclic compound or an optionally substituted heteroalicyclic compound at the start of the polymerization reaction.

Claim 135. (new) The method of claim 133 wherein the reaction mixtures comprises an optionally substituted norbornene compound at the start of the polymerization reaction.

Claim 136. (new) The method of any one of claims 124, 125, 126, 127 or 128 wherein each incorporated polymerization reagent is added to a reaction mixture over the substantial course of the polymerization reaction.

Claim 137. (new) The method of any one of claims 124, 125, 126, 127 or 128 wherein the polymerization reaction is a free radical mediated reaction.

Claim 138. (new) The method of any one of claims any one of claims 124, 125, 126, 127 or 128 wherein the polymerization reaction is an anionic, cationic or metal catalyzed reaction.

Claim 139. (new) The method of any one of claims 124, 125, 126, 127 or 128 wherein one or more of the polymerization reagents is selected from the group consisting of a fluorinated olefin, a carbon alicyclic compound, or a heteroalicyclic compound.

Claim 140. (new) The method of any one of claims 124, 125, 126, 127 or 128 wherein one or more of the polymerization reagents is 2-methyladamantanyl methacrylate, 2-methyladamantanyl acrylate, maleic anhydride, norbornene, 3,4-dihydropyran, or tetrafluoroethylene.

Claim 141. (new) The method of any one of claims 124, 125, 126, 127 or 128 wherein each of the polymerization reagents is a non-aromatic compound.

Claim 142. (new) The method of any one of claims 124, 125, 126, 127 or 128 wherein one or more of the polymerization reagents is an aromatic compound.

Claim 143. (new) The method of any one of claims 124, 125, 126, 127 or 128 wherein one or more of the polymerization reagents comprises an optionally substituted phenyl or optionally substituted naphthyl moiety.

Claim 144. (new) The method of any one of claims 124, 125, 126, 127 or 128 wherein one or more polymerization reagents are added over at least about 80 percent of the duration of the polymerization reaction.

Claim 145. (new) The method of any one of claims 124, 125, 126, 127 or 128 wherein at least two polymerization reagents are added over the substantial course of the polymerization reaction.

Claim 146. (new) The method of any one of claims 124, 125, 126, 127 or 128 wherein a radical initiator compound is added over the substantial course of the polymerization reaction.

Claim 147. (new) The method of claim 146 wherein the initiator is added at a rate to maintain a substantially constant concentration of initiator within the reaction mixture over the substantial course of the polymerization reaction.

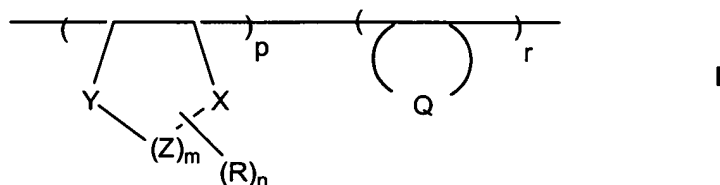
Claim 148. (new) The method of any one of claims 124, 125, 126, 127 or 128 wherein a reaction vessel is initially charged with one or more polymerization reagents, and one or more polymerization reagents having a faster reaction rate than the charged reagents are added to the reaction vessel over the substantial course of the polymerization reaction.

Claim 149. (new) The method of any one of claims 124, 125, 126, 127 or 128 wherein the polymer comprises photoacid labile repeat units that contain a tertiary alicyclic group.

Claim 150. (new) The method of any one of claims 124, 125, 126, 127 or 128 wherein the polymer comprises a polymerized fluorinated unsaturated monomer.

151. (new) The method of any one of claims 124, 125, 126, 127 or 128 wherein the polymer comprises a fused heteroalicyclic group having an oxygen ring member or sulfur ring member.

152. (new) The method of any one of claims 124, 125, 126, 127 or 128 wherein the polymer comprises a structure of the following formula:



wherein X, Y and Z are each independently carbon, oxygen or sulfur, with at least one of X, Y or Z being oxygen or sulfur, and preferably no more than two of X, Y and Z being oxygen or sulfur;

Q represents an optionally substituted carbon alicyclic group fused to the polymer backbone;

p and r are the mole fractions of the respective units and each of p and r is greater than zero.

153. (new) The method of any one of claims 124, 125, 126, 127 or 128 wherein the composition is a chemically-amplified positive-acting resist.

154. (new) The method of any one of claims 124, 125, 126, 127 or 128 wherein the composition is a negative-acting resist.

155. (new) The method of any one of claims 124, 125, 126 or 127 further comprising applying a coating layer of the photoresist composition on a substrate; exposing the photoresist coating layer to patterned activating radiation; and developing the exposed photoresist coating layer to provide a resist relief image.

156. (new) The method of claim 155 wherein the photoresist layer is exposed with radiation having a wavelength of less than about 300 nm.

157. (new) The method of claim 155 wherein the photoresist layer is exposed with radiation having a wavelength of less than about 200 nm.

158. (new) The method of claim 128 wherein the photoresist layer is exposed with radiation having a wavelength of less than about 200 nm.

159. (new) The method of claim 155 wherein the photoresist layer is exposed with radiation having a wavelength of about 193 nm.

160. (new) The method of claim 128 wherein the photoresist layer is exposed with radiation having a wavelength of about 193 nm.

161. (new) The method of claim 155 wherein the substrate is a microelectronic wafer.

162. (new) The method of claim 155 wherein the substrate is a microelectronic wafer.

163. (new) A method of forming a photoresist relief image, comprising:
- (a) applying on a substrate a coating layer of a photoresist comprising a photoactive component and a polymer obtainable by adding over the substantial course of a polymerization reaction one or more incorporated polymerization reagents to a reaction mixture; and
 - (b) exposing the photoresist layer to radiation having a wavelength of less than about 300 nm and developing the exposed the photoresist layer to yield a relief image.
164. (new) The method of claim 163 wherein the photoresist layer is exposed with radiation having a wavelength of less than about 200 nm.
165. (new) The method of claim 163 wherein the photoresist layer is exposed with radiation having a wavelength of about 193 nm.
166. (new) The method of claim 163 wherein multiple incorporated polymerization reagents are reacted, and the incorporated polymerization reagent with the fastest reaction rate relative to the other incorporated polymerization reagents is added to the reaction mixture over the substantial course of the polymerization reaction.
167. (new) The method of claim 163 wherein multiple incorporated polymerization reagents are reacted, and the incorporated polymerization reagent with the second fastest reaction rate relative to the other incorporated polymerization reagents is added to the reaction mixture over the substantial course of the polymerization reaction.

168. (new) The method of claim 163 wherein multiple incorporated polymerization reagents are reacted, and the incorporated polymerization reagent with the slowest fastest reaction rate relative to the other incorporated polymerization reagents is present in the reaction mixture at the start of the polymerization reaction and is not added to the reaction mixture over the substantial course of the polymerization reaction.

169. (new) The method of claim 163 wherein the polymer is obtained by adding over the substantial course of a polymerization reaction one or more incorporated polymerization reagents to a reaction mixture.

170. (new) The method of claim 163 wherein the polymer is obtained by adding over the substantial course of a polymerization reaction one or more incorporated polymerization reagents to a reaction mixture.

171. (new) The method of claim 163 wherein maleic anhydride is added to the reaction mixture over the substantial course of the polymerization reaction.

172. (new) The method of claim 163 wherein an acrylate compound is added to the reaction mixture over the substantial course of the polymerization reaction.

173. (new) The method of claim 172 wherein the acrylate compound comprises a photoacid-labile ester.